

Abstract of the Disclosure

The present invention provides for adaptive filters that have improved convergence, computational, and memory bandwidth proprieties. When applied to telecommunication applications, the present invention additionally provides for improved methods and systems of canceling echoes. In one embodiment of the adaptive filter of the present invention, a filter, preferably an adaptive finite impulse response (FIR) filter, of an appropriate length,  $N$ , is chosen. Once the filter is chosen, convergence is achieved using a convergence process. With convergence complete, the total energy of the filter coefficients is computed and two energy thresholds, a first energy threshold and a second energy threshold, are set relative to the computed total energy. Using the set energy thresholds, new filter coefficients are determined by relating the starting filter coefficient with the first energy threshold and the end filter coefficient with the second energy threshold. A first filter delay, in accordance with the determined start coefficient, is incorporated into the filter operation.